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# In Pursuit of Diamondback Terrapins

THE LADIES OF THE LAGOON FUND  
A COLLABORATIVE STUDY OF THE  
ADAPTIVE AND ELUSIVE TERRAPIN

WRITTEN BY ELLIE VAN OS

Eastern Florida diamondback terrapin —  
*Malaclemys terrapin tequesta*





Turtles flourish in Florida. They are by no means exclusive to the state, but our mild climate, sandy soils and year-round food sources have for millennia offered the optimum conditions for these ancient reptiles to thrive. We celebrate our nesting sea turtles, gopher tortoises and diverse freshwater turtles, but there is one turtle — the diamondback terrapin — that has inhabited the Indian River Lagoon for years, but for which only recently has there been a concerted effort to identify its strongholds.

Although “turtle” is the more familiar name for four-legged shelled reptiles, in the British Isles, “terrapin” refers to any species of turtle — freshwater, brackish water or, as box turtles are, terrestrial. It is not surprising, then, that the name of this east coast reptile is said to have originated with early British settlers in North America.

Florida is home to 30 turtle species and an additional 15 subspecies. Its diamondback terrapins include four of the aforesaid subspecies, believed to be distributed somewhat evenly along our 1,300-mile coast, although the species ranges from New England to Texas. Our subspecies in the Indian River Lagoon, which is generally described as darker than the others, is the eastern Florida diamondback terrapin (*Malaclemys terrapin tequesta*) and ranges from St. Augustine to south Miami.

Generally, terrapins have a keeled carapace or shell, and their scutes, which are the scales that cover their shell, have distinctive concentric circles. Their skin is gray, and black spotting covers their head and necks. Only some have a black crown, but all have light-colored jaws. Able to survive in fresh or salt water, they prefer the intermediate salinities of estuaries and subsist on the fish, shrimp, worms, clams, crabs and plants that share their habitat. In preferring coastal counties, they live in a popular, highly developed part of the state.

Terrapins have protective adaptations to salt water. Their skin is impermeable to salt water, and they have glands that concentrate salt for discharge through their tear ducts, unlike their freshwater relatives. They have a unique ability to drink fresh water and rain from the surface layer of their aquatic habitats.

Bound to their cold-blooded condition, when air temperatures drop below 50 degrees, it becomes increasingly difficult for them to move their legs and digest their food. Their metabolism gets sluggish and they stop eating and seek out an undisturbed place to ride it out, particularly mud. They do not really hibernate, but they slow down their activity

When the trap is removed, Tyler Zudans and Nancy Kim Pham Ho check it for any problems and re-bait it.





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level by a process called brumation. Regardless of their need to brumate below 50 degrees, with this hard-wired survival technique, Florida remains an ideal habitat. Unfortunately, as with other coastal species, human stressors and habitat loss are among their most threatening issues.

An increasing number of environmental projects on the Indian River Lagoon this century are effective collaborations. When, in 2015, Rick and Laura Herren from Coastal Biology Inc., then living and working on the Treasure Coast, wanted to investigate east coast diamondback terrapin whereabouts in Indian River County, they enlisted the help of Nancy Kim Pham Ho. At the time, she was with Florida Institute of Technology (FIT) at the Vero Beach Marine Laboratory adjacent to Tracking Station Park in Indian River Shores. Together they spent a few hot weekends scouring suitable wetlands in search of the elusive terrapins, with no luck. Then Pham Ho heard through FIT about the fisheries work Indian River Land Trust (IRLT)

Considered  
a successful  
field day by the  
biologists, it was  
a remarkable day  
from my point  
of view.



This diamondback terrapin has a growth on its carapace that will serve as its unique identification mark in the records.

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was conducting at its 110-acre Bee Gum Point property in Indian River Shores. She contacted David Heuberger, IRLT’s director of land protection, who told her that Dan Gold of the Indian River Mosquito Control District, who does routine surveys of the impoundment on the property, had a blurry picture of what Heuberger believed was a terrapin. She sent Gold more information about the species, and from then on he would let her know every time he saw one.

Coastal Biology contacted Indian River Lagoon Aquatic Preserves (IRLAP) with the Florida Department of Environmental Protection (FDEP), which has been researching terrapins on the lagoon since the early 2000s. IRLAP had in the meantime teamed up with Brevard Zoo on the north end of the Indian River Lagoon in 2012. With this additional information, they began putting into motion a long-awaited terrapin genetics project.



Assisted by interns, Emily Dark, an environmental specialist with Indian River Lagoon Aquatic Preserve, measures a terrapin.



A diamondback terrapin caught at Bee Gum Point for research





David Heuberger pulls a trap at Bee Gum Point with a diamondback terrapin in the lower left corner.

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In the summer of 2016 the Ladies of the Lagoon, the fundraising branch of the IRLT, funded the project. With part of the funds Pham Ho, now with Coastal Biology, brought 14 interns recruited from her summer camps out to the property to help with the field work. A critical component of the research was the design of a safe trap that would capture the terrapins while ensuring that they would have access to both air and water. These traps would then be checked once a day while they were deployed in the summer months, and captures would be biopsied and notched on the scutes of their carapace for future identification.

Data gathered from the 2016 study included 22 terrapin biopsies, nine from Indian River County. They were sent to Texas A&M University Corpus Christi’s Genomics Core Facility in collaboration with Dr. Derek Hogan in the Department of Life Sciences. The goals of that program were to test and confirm the sampling methodology and to contribute to the state genetic program being conducted by Traci Castellon of the Florida Fish and Wildlife Conservation Commission. Information of this type is used to assess the health of the population and to determine if terrapins are eligible for listing as an imperiled species.

This past summer, without the feeder program of summer camp, Pham Ho supervised Tyler Zudans, Coastal Biology’s lone intern, who committed to checking the equipment once a day. Emily Dark, an environmental specialist

with IRLAP, recruited intern Nicole Schumann, and together with Heuberger of the IRLT and the Environmental Learning Center, they sponsored four additional interns who helped with the program: Lillie Harris, Blake Strawte, Pedro Tellez and Airea Williams.

I was able to accompany the biologists and their interns into the field at Bee Gum Point this past summer. Having lived and worked in the mangroves in this area for my entire career, the anticipation of seeing one of these striking terrapins was energizing. It took three trips to Bee Gum Point before I actually saw a wild terrapin. That day, Heuberger, Dark and six interns went out to check three traps set up the night before by Heuberger, but also to use the experience as a teaching tool for the interns.

The first trap was 100 feet off the end of a small dock on the north end of the impoundment. After launching a canoe, one of the interns paddled out to the trap and hauled it out. It was disappointing that there were no terrapins, but nonetheless the trap needed to be brought back to land to be serviced.

The second trap was at a location relatively close to a pump that keeps the water level high in the impoundment for mosquito control. There was some debate as to whether the pump impacted the use of the area by the terrapins. I had checked that trap with Pham Ho and Zudans twice before and this was the third time it came up empty when I

was present. However, it was not far from this location that a terrapin, the only Indian River County specimen collected to date, had been captured, notched for identification, biopsied and at a later date, recaptured. The first time, it was caught in a body of water connected to the greater lagoon. The second time, it was crawling across the berm, an artificial barrier between the impoundment and the lagoon, suggesting that the terrapins move back and forth.

When Heuberger went out into the soft muck of the nearshore wetland to check the third trap, we were lucky. A terrapin was brought ashore. After an examination, the length and width of its carapace was measured, and it was weighed and biopsied for DNA analysis. Interns participated in this process by recording data, tending the terrapin and assisting with the equipment. Whereas normally it

would have been notched on one of its scutes for future identification, this animal had a distinguishing growth resembling a barnacle that had formed on its carapace early in life, so it was released without fanfare in the area where it had been captured.

Considered a successful field day by the biologists, it was a remarkable day from my point of view. It is easy to take our fauna and flora for granted as we enjoy each day in this beautiful part of the state, but when we are fortunate to witness a study like this that locates one of our more elusive inhabitants, it feels so much more than that. Their work is not done; they continue to keep an eye out for nests because that will open up an entirely new opportunity to gain a better understanding of their breeding biology and habitat requirements. 🌿



Two ambassador diamondback terrapins, Little Spot and Big Spot, are part of a Smithsonian exhibit at the St. Lucie County Aquarium.